

# Main Currents

IN MODERN THOUGHT

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## SCIENCE, PHILOSOPHY & RELIGION

## Conference Notice

Last September an important event took place in New York City, the first Conference on Religion, Science and Philosophy. Distinguished persons in many departments of life took part, Albert Einstein among them, and the occasion was noteworthy not only for this, but because of the frankness of the discussion. The speakers faced up to the fact that civilization is threatened by ignorance of an essential kind. Mortimer J. Adler of the University of Chicago spoke the central truth in the minds of many persons when he said: "It is probably not from Hitler, but from the Professors, that we shall ultimately be saved."

The papers prepared for the Conference have now been published by its Executive Committee as a book, Science, Philosophy and Religion: A Symposium, arranged in five sections: Introductory, The Social Sciences and Humanities, Philosophy, The Natural Sciences, Religion and the Philosophy of Education. The Conference is concerned with the integration of these disciplines. Readers of MAIN CURRENTS will rejoice to know that such an enterprise has been undertaken with determination and by first-rank men of every religion (and of no religion) representative of the West. It is not enough, for there is also the East, but the Conference plans annual development and may yet we hope call in someone like Dr. S. Radhakrishnan.

The integration of all experience is a serious if not a desperate issue; this is indeed our very own thesis in these rainbow pages of MAIN CURRENTS. The relation of science, philosophy and religion (and, let us add, art) is so confused that principles of social conduct have become almost shadows. The present disintegrated state of the human mind, the vast unrelated accumulation of fact, the cynicism and doubt about historical religion, the anti-social uses of material science---all this lies at the bottom of the economic and social disorders. These factors indeed aggravate much of the mental and physiological sickness of mankind. We have a dreadful disease, acute fact-fatigue, compounded with definite philosophical confusion, and the patient is in a bad way.

The Conference proposes to proceed with the unifying of its several disciplines (science, philosophy & religion) year after year. Would it not be well to have the proper authorities first set forth what is really accepted in each discipline, in terms which would permit of sharing? It surely must be not impossible to describe with workable exactness the relatively few established principles, say, of physics so that a biologist would be able to cogitate with all of them before him? The greatest mass of material in curricular texts and encyclopaedias is ephemeral or practical. What really is known of enduring and universal law? What do we all accept about the nature and relation of inner (or mind and soul) and outer (or matter and body)? There are many principles which we all know about, usually immortalising some scientist's name: Kepler, Mendel, Weber-Fechner. Not all knowledge can be stated in simple law form. All the more important to have it identified. It would be an enormous first kindness to a multitude of the friends of the Conference to have a compendium of this sort at hand.

The Conference, however, in some manner or other of its own proposes to achieve an integration. And it must, if only because from one of its first efforts (here recorded) certain wrong deductions were instantly made in pulpits the Sunday after the words were spoken. We quote verbatim the passage in Dr. Einstein's paper which caused this flurry:

....."the main source of the present-day conflicts between the spheres of religion and of science lies in this concept of a personal God." "The more a man is imbued with the ordered regularity of all events the firmer becomes his conviction that there is no room left by the side of this ordered regularity for causes of a different nature. For him neither the rule of human nor the rule of Divine Will exists as an independent cause of natural events. To be sure, the doctrine of a personal God interfering with natural events could never be refuted in the real sense by science, for this doctrine can always take refuge in those domains in which scientific knowledge has not yet been able to set foot. But I am persuaded that such behaviour on the part of the representatives of religion would not only be unworthy but fatal. For a doctrine which is able to maintain itself not in a clear light, but only in the dark, will of necessity lose its effect on mankind with incalculable harm to human progress. In their struggle for the ethical good, teachers of religion must have the stature to give up the doctrine of a personal God---that is, give up the source of fear and hope which in the past placed such vast power in the hands of priests. In their labors they will have to avail themselves of those forces which are capable of cultivating the Good, the True and the Beautiful in Humanity itself. That is, to be sure, a more difficult but an incomparably more worthy task."

When these words reached the public there were offended reproofs from many clerical quarters. It was perfectly evident that all the makings of a conflict between religion and science were at hand, and in a form much worse than that which followed the days of Darwin. For the new conflict is not about man, concerning which we might have some good opinion, but about God. The subject is so vast and so tangled with feelings too little illuminated by true knowledge as to form an ideal situation for senseless passionate argument.

In the basic bibliographies which our MAIN CURRENTS group is slowly assembling we shall show that no real problem has been raised by Dr. Einstein. It is habit, tradition, fear, ignorance which prompts an outcry. If Einstein is right (and no reader of our pages will doubt it), then either there are no or there are many "personal" Gods under the Supreme Law, the universal order. At once the dreaded word polytheism arises, and the specter of oriental imagery and classical paganism haunts the man dependent on a creed. To deal with ignorance and fear will be an educational issue the Conference will have to face later. But it must first produce an integration of knowledge which will have as much authority in each of the domains (science, philosophy, art and religion) as may be needed to bring together all principal educators, the cultured leaders in the churches, the professions and so on. The papers in this volume are fascinating and promising, but they are much more: a contract with the world, a heavy responsibility. The Conference can make world peace, the only kind that lasts, peace of heart and mind.

We recommend this first Symposium to our readers without reserve. We shall also report its progress unfailingly, year by year. F. K.

SCIENCE, PHILOSOPHY AND RELIGION: A Symposium. Published by the Conference on Science, Philosophy and Religion in Their Relation to the Democratic Way of Life, Inc. New York, 1941. pp. 443 \$1.50

ALICE IN LOGICLAND

MANY-VALUED LOGIC

Seven years ago Dr. F. Zwicky of California Institute of Technology pointed out that the many ways in which the same few atoms can combine now makes new demands upon the united methods of logic and mathematics. In the case of mathematics vast changes

have been brought about by challenging fundamental propositions of every sort. Many of these changes were effected long before modern physics had need of them. Geometry, for instance, derived from Euclid, familiar to us in school, has been enlarged with non-Euclidean geometries which start with propositions like this: no lines (or any number of lines) parallel to a given line can be drawn through a point outside that line. These geometries have turned out to be not altogether unfamiliar, something like conic sections at infinity. And they proved useful long years after in Relativity. But meantime no equally basic challenges to logic were made, although Peano, Russell, Whitehead and others examined and re-established on a new foundation the relation of logic and mathematics. Following up Dr. Zwicky's suggestion, Professor J. Barkley Rosser of Cornell challenged the logical notion of reductio ad absurdum, which has a basic place in logic like Euclid's proposition about parallels in geometry. Dr. Rosser presented a paper to the American Mathematical Society at its last meeting (N.Y. Times, 23/11/40), expounding the "many-valued logic" developed. The results can be graded into two-valued logic (so or not so), three-valued, four-valued, and so on to n-valued. In three-valued the word and turns out to have 256 meanings, and in four-valued it has 14,348,907 meanings. (And, of course, is a colourless conjunction. Man and horse could be any way round, man above horse gets a little more exact, though still vague---how far above horse, how frequently above horse ?) Thus from two possibilities in two-valued logic (so and not so) we can proceed to three-valued, where statements are so, not so, and undecidable. In six-valued logic statements can be certainly so, probably so, possibly so, possibly not so, probably not so, and certainly not so.

This new development in logic is another of those advances toward the orient. For the thought of India has never been based upon so and not so, and hence it has not been divisive. The many-valued logic of Dr. Rosser may result in profound changes in attitudes in the West, combined with other developments as they come along. The East is supposed to be subtle, untrustworthy, evasive. Usually the imperial mind has prided itself on its forthrightness and has felt superior. We shall find out things are not always so or not so, at least we cannot determine always that they are. Perhaps we shall become a little more profound. We shall begin to meet the orient. The protent is good. Dr. Rosser has started an important innovation. And we say that that is so, and not not so, perhaps so or any other kind of so ! F. K.

#### ORGANIC MUSIC

#### SPHERICAL HARMONICS

Edgar Varese suggests (Herald Tribune 15/12/40) that structures of all kinds both natural and man-made may be looked upon as musical, and that physics has proceeded far in showing this to be so---much further than music composing has gone in using the knowledge. This is of course true in all the arts. Subjective painting is not as yet an attempt to explore the abstracts of nature as much as it is a spilling of the contents of the personal unconscious of the artist. The controlled and often sentimentalised more or less conscious feeling-responses of the Victorian painter to his subject have been displaced in abstract art by the uncontrolled welling-up of the personal unconscious. This does not make such work false. It has in some ways more truth; it is truer for the artist himself. But it is very personal. As a distinguished painter, friend of MAIN CURRENTS, says of the subjective painters: "They have had their fun. All right. But they mustn't expect everyone else to feel the same about it !" We need an enlargement of such a principle as Hambridge's dynamic symmetry which is only a tiny fragment of nature's general laws or abstracts. A true school has yet to arise composed of artists so disciplined and informed that they can feel these abstracts just as a botanist knows the laws of phylotaxy (leaf distribution), or an astronomer knows Kepler's laws of planetary motion. In the case of music the abstracts have reference more to the soul than to the body, as Plato pointed out. Number is intervals, zeros are points. Space (with time) organizes matter or points and everything is in constant flux. In natural forms, such as crystals, the distribution is orderly and harmonic, as is known in the Goldschmidt law of complication. Resonance is a word we hear often now in physics. The thesis of Varese is that music



must become organic. This proposition for music parallels the proposition that painting must eventually establish itself (no doubt in new ways) once more upon nature's static abstracts. Supersonics, colour organs, radio-organs---we approach a period of gorgeous, almost intolerable, richness for which we desperately need unification and simple statement of nature's Ideas.

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An attempt to state a theory of the cosmos as a musical process has been made by Dr. Fredericka Blanckner of Western Reserve University, Cleveland (Herald Tribune 5/1/1941), starting from the familiar Chladni's plates of plane geometrical figures, and advancing to geometry in solid form shown by musical effects upon particles in space. Dr. Blanckner follows Pythagoras into the spheres, prescribes different orders of patterns for galaxies, sums of galaxies, and so on. Coming to man, she says:

"The bodies of human beings occupy the nodes of a type of vibration probably higher than that which forms the more purely material bodies. As the cosmos may truly be regarded as an emotional or psychological, as well as a biological, physical, chemical or other type of phenomenon, so it may with exactness be considered an acoustical phenomenon, only an infinitesimal fraction of the full scope of vibrations being within the range of our hearing or other senses."

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Mr. Martin Schwarzschild, astronomer, Columbia University, described the interior structure of the Cepheid variable stars in terms of music, before the American Association for the Advancement of Science at its meeting on January 1, 1941. These variables swell and contract at a speed of many miles a second, the several rates involved having mutual harmonic relations. (What Pythagoras called the music of the spheres is now studied under the general heading at the top of these items, spherical harmonical analysis. In this a function is spread over a spherical surface. The result, in a single case, might look like a globe's lines of latitude and longitude - in general, symmetrical patterns. The method has wide application to heat, electricity, and so on.

F. K.)

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A valued correspondent prompted by the book, Modern Logic and the Task of the Natural Sciences, by Harold N. Lee, noticed in these pages last month, writes: "Lee says, 'I doubt if the advance in science and understanding that I am hopefully forecasting will come primarily from logicians. Instead, I should expect it to come from students advanced in their own fields of study.' And he adds that if they have a knowledge of the abstract order systems worked out by logicians it will help to give them the insight to discover new order types, fertile of applications, in their own fields. The first ranks of these coming students 'advanced in their own fields of study' may be from linguistics. For languages are full of highly systematic order types, non-mathematical, of many different kinds and levels. Already Hjelmslev in Denmark and Trager and others in the U S A have done some work along this line. Moreover the semantics or ideational patterns found in diverse languages are themselves logical systems of the greatest diversity and interest, albeit unconsciously possessed and automatically applied. And, since to a large degree thought is language, the explicit formulation of these unconscious systems will be helpful for abstract logic itself and for its application." We may add: such formulation will also be of the highest value in understanding mind as such. Animals communicate, perhaps richly. When two horses stand switching parallel head-tail fashion they may be doing much more than chasing one another's flies away. Animal communion may be assumed. But man speaks fully, with restraint and, again, with authority. Hence language is an explicit means for mind, as well.

B.L.W. & F.K.

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Walter Lippman lately came to the aid of Dr. Hutchins and others who believe in the unity of culture by advocating educational method which conserves the general communal feeling among nations, a heritage built up over centuries. (Herald Tribune 30/12/41). For this, he feels that classical studies must be brought back into the curriculum as living and exciting experiences. He limits his totality to Western civilization, and directs his criticism mainly to America. But the world (we would say) is shrinking at such a rate through communications, trade, economic structural inter-dependence that we cannot stay content with Western integration. The East must be seen to. Who can look at Chinese or Indian art and philosophy, or think of Lao-tze, Buddha and Shankaracharya without realizing we must give room for these splendours in our life? When are modern thinkers like Mr. Lippman going to travel beyond the Suez Canal? It is sometimes difficult to be patient with such parochialism, while civilization dies just because it denies equality to such as India and China.

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Klaus Mann and other collaborators, including his father, have started a new monthly review of free culture, DECISION. The collaborators are: Sherwood Anderson, W. H. Auden (husband of Erika Mann), Edward Benes, Stephen Vincent Benet, G. A. Borgese, Ernest Boyd, Julian Green, Horace Gregory, Frank Kingdon, Freda Kirchwey, Thomas Mann, Somerset Maugham, Robert Nathan, Vincent Sheean, Robert E. Sherwood and Stefan Zweig. Among contributions to the first edition are Bruno Walter, Aldous Huxley, Henry Bernstein, Jean Cocteau, Richard Eberhart, Horace Gregory, Mr. Benet and Mr. Anderson.

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"Birkhoff's book is the first comprehensive treatment of the subject and its applications. It contains all the recent major developments in the subject in a unified form which will make the book an inspiring research reference for the relatively large number of research algebraists interested in the field. The exposition is clear and well written and should prove of great value in satisfying the demand of non-specialists in the subject who have been anxious for several years to obtain a text by the use of which it may be possible to present the subject as a graduate course in modern mathematics."

Adrian Albert, in Science Dec. 27, 1940 discussing LATTICE THEORY. Vol. XXV Colloquim Publications, by Garrett Birkhoff. 155 pp. New York: American Mathematical Society, 1940.

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This volume brings to the attention of scientist and layman important contributions of ten leaders in various scientific fields. These research workers write of the latest advance in their particular fields and the relation of the new discoveries to science as a whole. Each chapter is based upon a Sigma xi lecture.

SCIENCE IN PROGRESS, Edited by George Bartsell. Yale, 1940, Ill. 317 pp. \$4.00

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For Forty years H. G. Wells has been pondering the trends of our civilization. In 1908, before an airplane had flown ten miles, his "The War in the Air" foretold the modern air raid with the wholesale disorganization of life by bombing and described world-wide air warfare. "The Shape of Things to Come", written in the early twenties, when the nations had all solemnly renounced war and Hitler was unknown, predicted a great European War in the early 1940's (yes, that date was given !), said that it would start between Germany and Poland in a bicker over the Polish Corridor, told of the concrete-roofed shelters, the burrowing underground, the devastated, smoking cities, the hordes of refugees, the steady decline, year by year, into chaos and barbarism; even described a war between Japan and China going on along with the European cataclysm -- foresight truly uncanny !

A man who commands such insight into the great trends underlying history should be heard with the greatest respect. On Dec. 2, 1940, Wells spoke in Hartford, Conn. on "The Immediate Future". A hundred years ago, said Wells, the various countries and especially the two hemispheres really were isolated from one another by distance. Thus they had been for thousands of years. There was little meaning in neighborliness, in brotherly cooperation, under those conditions. It would have been impossible even had it been needed. But now air transport and the radio have destroyed isolation and made countries close neighbors willy-nilly. Yet the old political systems fashioned for an outmoded situation have not been changed a jot.

If brotherly or friendly cooperation is inherently impossible, then verily we are doomed ! It is not merely civilization that would perish; the great bulk of the human race, must die too - naturally, for the food struggle is too severe for uncivilized man. In a semi-wild state only handfuls of brutish human creatures could survive. Whatever else declined the making of aircraft and explosives would go on under nuclei of powerful brutalized men, exploiter toughs, tyrants or gangsters, while a flicker of intelligence remained to be coerced. No world-cooperation equals constant air warfare, equals world-wide air gangsterism, equals end of civilization and peaceful cultures, equals twilight and obscuration of the human race from this globe.

But Wells insists that friendly cooperation is possible. It is simply difficult, and so has not been tried. The idea is too new; we still think in terms of thousand-year-old ideas, ideas of national entities, national prides, relations of vassal and lord, ruthless competitions, self-seeking, self-contented Toryism, and other old idea-systems in which ideals of brotherhood and cooperation were always naturally taboo. What we must begin to have, must begin to think about now, says Wells, is this increasing cooperation, in the sense of active planning for control, by men of good will and knowledge everywhere. The men of brotherhood must control, peaceably and yet forcibly, the men of hate and ill-will and keep them down by virtue of the superior knowledge, science, and will-to-cooperate vested in the men of brotherhood, and by means of a world-wide Board of Control of the Air. This Federal Air Control is of the utmost vital necessity. It is a difficult thing, but it can be made to grow out of the armistice that will eventually come as a first pause between the staggering, bomb-groggy present combatants. But this armistice will be only a pause unless air power at that time is taken from all individual nations and vested in a world-federated authority -- not a league, but an autonomous federation. Then, when the powers seek to war again, as they will, they cannot use the air. This world authority will have disarmed the air and formed an air police to keep it disarmed. This, says Wells is our best chance to salvage civilization.

B. L. W.

(See also School & Society, Dec. 21, 1940, Vol 52, p. 652 for a valuable report of Mr. Wells at a luncheon by the trustees of the Town Hall, N. Y.)

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"These are tense times, when our perspective is apt to be warped and our judgment of relative values distorted by the necessity for material security. Admittedly, guns are important, if we are to protect our rights as a free people. But, art also is important, if we are to retain that way of living for which we are so willing to fight. Admittedly, our unified energies must be concentrated on military defense. However, there remains another essential - spiritual nourishment - for man has many hungers.

If art is a luxury, as most people claim, then also are concerts, radios, football games, theatres, porcelain bathtubs and central heating. We could live without any or all of these things, which by rigid definition must be classed, along with art, as civilized appendages that go with the fuller life. Yet a home unadorned with art is an embarrassing cue to the barrenness of the owner's mind. Art is essential; art is wealth. And, in this connection, I want to reprint one of my father's editorials, which first appeared in the February 1, 1927, ART DIGEST and has since been widely quoted --- Art & Wealth: ---

'Not all of those who respond to the aesthetic thrill of art have considered what art can mean to a people in a material way - how it can add to their collective prosperity and their national wealth.

It is the simplest sort of problem in economics. An artistic people will take one dollar's worth of raw materials and, by converting it into an object of beauty and utility, make the product worth five dollars in the markets of the world; while an inartistic people will take the same raw material and transform it into an object of utility worth only half as much. In the aggregate of a nation's production the wealth thus gained can easily run into billions - wealth obtained without using up one additional ounce of raw material, wealth that comes out of the taste of the people.

Artists are the most marvelous creators of wealth. If Italy sold to the connoisseurs of the world out of her public collections the painting and sculpture produced by only ten of her great masters she could pay the whole of her national debt. And Michelangelo was not too proud to design a pitcher !

One of the finest as well as one of the most material services an American citizen can render to the state is to aid in the nation's understanding and appreciation of art."

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THE COLOR SCHEME of MAIN CURRENTS facilitates of ready recognition of the department to which the sheet belongs, and uniform filing. Each sheet is dated at the bottom, left, to identify the issue. By sending the issue out unbound, filing sheets intact is possible. And also we can move any department up to the front of the magazine, when it seems important to have that department lead off.



In conformity with our policy of keeping a record if possible of every book which may be a starting point of a basic bibliography in topics important to philosophy, we note the comprehensive critical review of adaptive coloration in animals just published by Hugh B. Cott (details below). It is well known to all nature lovers that likeness of poisonous reptiles to non-poisonous, resemblance of creatures to their background, imitation of one kingdom by a member of another (as in the case of insects looking like leaves), and so on form one of the philosophical mysteries of nature. Is this process intelligent or accidental? How did it arise? The penetration of this mystery with finality will constitute a definite advance in knowledge. The present work is therefore of the greatest importance and may form the lead-off book in a basic bibliography of this subject for us readers of MAIN CURRENTS later. At this stage it may be said that on the whole protective coloration is effective even in creatures who cannot control it. Whence it follows that nature is purposeful as a whole---this is very different philosophically from saying an individual strives purposefully. (It is also shown by Cott that the disguises put on and off by lizards etc., also is highly effective.) This work will be a landmark in the integrated thinking which is going to be demanded of the new world that is to follow after this era of disorder has passed away. A wonderful book, illustrated with 48 plates and 84 figures and a coloured frontispiece !

ADAPTIVE COLORATION IN ANIMALS, Hugh B. Cott, Ox. Un. Press 1940, 508 pp. \$8.50

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Workers at the Mitchurin Central Genetic Fruit-Berry Laboratory report that after pollinating and ~~cherry~~ on peach, for five years the progeny were exclusively pollinated by peach, but all the 120,000 hybrid descendents nevertheless resembled the sand cherry mother. The Mendel-Morgan law does not explain the disappearance of the male influence, but the Russian biologist Lyssenko (see below) has enunciated a theory which provides an explanation. (Biol. Abs. Nov. 1940, 14274).

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The importance of the maternal plant in hybridizing is reported in another Russian item (Biol. Abs. Nov. 1940, 14264). If the maternal plant is well suited to local conditions, best of all if it is a local variety, then the plants to be used as staminate (males) may be brought from a distance.

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In the steady stream of results from Russian plant breeders comes still another confirmation of their thesis that environment properly adjusted to the plant has approximately and sometimes quite as much influence as hybridization or other genetic cause. Seeds of a hybrid of catjang were taken from the very same pod and subjected to such control (which according to earlier Russian findings means independent control of number and hours of light and heat and intensity thereof as well as amounts and periods of moisture and so on) gave different results. From such experiments by Mitchurin, Lyssenko declares: "Organisms similar in their initial and original formation will give different progeny if these forms are trained under different environment". (Biol. Abs. Nov. 1940, 14245. A further confirmation is in 14258, reporting another instance of the importance especially of light period or stadium deeply influencing hereditary characteristics.)

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The streaming or flow in protoplasm was reported by Dr. William Seifriz of the University of Pennsylvania in 1937 (MAIN CURRENTS, Nov. 1940) to have a major rhythm of about 45 seconds in the yellow slime mold *Physarum polycephalum*. N. Kamiya in



the same laboratory found the pulse to be compound, and has determined that the pressure exerted by the streaming is about five ounces per square inch.

We are repeatedly brought back by items such as this to the fact that crystals are constructed upon rigid Euclidean space lattices, whereas the curves of living substances fundamentally betray properties of time. If that which gives rise to all growth and cyclic organic change is conceived as a lattice of time curves analogous to crystal space lattices we have perhaps a useful idea with which exactness may be given to the study of living substance and living forms. (A technique for observing the streaming of protoplasm in sieve tubes is reported by James Small, New Phytol, 38 (2)--176-177, 1939, Biol. Abs. 9407.)

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The field of force created by living cells in appropriate plasma, between two masses of tissue, has been studied at the Institutun Divi Thomae and was reported at the annual meeting of the Association for the Advancement of Science (Herald Tribune 30/12/40). The two masses formed a bridge of wrinkled curved lines resembling lines of force round a magnet, and upon this channel the individual cells then began to migrate.

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Further evidence of the connection of brain currents (whose nature is not known) and electricity was reported at the same meeting by Dr. A. Barnett and M. Posner of the N. Y. State Psychiatric Hospital. Alternating-current impulses were superimposed on the brain currents, resulting in physical actions by the patient.

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Extended experiments with acetylcholine upon rats have been carried on by Dr. G. M. Peterson of the University of New Mexico to show that application to the appropriate side of the cortex results in changing the rat from one habit (say, dextral) to the other, rats varying like humans in right and left handedness. The results are of very little importance and bring forward once more the benefit of a little philosophy as a substitute for incredible waste of suffering and time. This constant stumbling along without trying to get ourselves intellectually organised is an evil of the era. At the same meeting of the Association Dr. A. J. Carlson of the University of Chicago said truly that this is not the age of science and that it might perish and science reappear when men are better. (His reference was to Hitler and company, but the principle is the same). As to the two cerebral hemispheres, and dexterity, and so on, there is a vast wealth of material available now, to be published presently, which goes to show that the symmetry of forms can be explained only by taking the bold step of declaring that there is an independent reality in the psyche, and that more than three dimensions have a psychological reality. The conclusion of the reasoning (which, simply stated, is that the kingdoms have each a basic symmetry point for crystals, linear for plants and bilateral for animals) is that in the case of man the bilateral symmetry is only superficially like that of animals, as is witnessed in the fact that the two halves of our faces are extremely asymmetrical in details. In short, with man the bilateral principle has quite new meanings. The conclusion of this reasoning is that experiments upon animals along these lines will have practically no meaning as regards man as man, and very little as to man as animal. At any rate it is clear that a little more use of thought (as Bernard Shaw long ago pointed out) would save all concerned a lot of suffering, including the lowly rat.

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At the recent meeting of the American Institute of Radio Engineers the electron microscope developed by the Radio Corporation laboratories at Camden, N. J. was shown, along with photographs taken of bacilli at 100,000 diameters. It is a strange moment in history which sees this new development of sight into the very tiny while at the same time the new Palomar telescope prepares to do its first work upon the very large and very distant.

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The following extracts from a review by Dr. Margaret Nordfeldt of *The Integration of Personality*, by C. G. Jung (Farrar and Rhinehart, 1940, \$3.) in *Survey Graphic*, December, 1940 gives a vivid account of the latest report on our psychological innards by the greatest master of this subject. Dr. Nordfeldt says "layman and specialist alike will find in it a wealth of material of far more than technical significance." She then proceeds:

Readers of Jung's earlier writings are familiar with his concept of the collective unconscious, that archaic mode of thought immensely older than our personal consciousness, which persists in the psyche of each one of us, just as the human body of today retains traces of its physical ancestry. If anyone supposes, argues Jung, that man's psychic life consists only of his consciousness and his will, let him look at our present world where no one wants war but no one knows how to stop it." ". . . . with the group 'psychic life works itself out like an uncontrolled law of nature.'" "The shadow world of the unconscious is peopled by strange and powerful figures, sometimes benevolent, sometimes menacing, but always autonomous and potent, which primitive man projected into gods. But a modern man who has lost belief in the gods without, is no less swayed from within by these same forces, these 'immortal demons.' Man's recent and hard won consciousness can never swallow this unconscious; . . . . . the artist, at least, knows that from the psychic depths, issues the springs of creative life. Man seeks, for unity, and 'consciousness and the unconscious do not make a whole when either is suppressed or damaged by the other.' But if the psyche consists of two incongruous halves that should make a whole, there is need for an integrating process to accomplish the union. That process is the theme of this book. The argument is not given schematically for the various chapters were originally given as lectures to different audiences and under differing conditions" The fruits of several years study of the Greek and Roman texts of medieval alchemy ". . . . are embodied in a fascinating chapter, 'The Idea of Redemption in Alchemy,' in which we are reminded that to the alchemistic philosopher making gold meant spiritual transmutation, what to-day we should call psychological transformation." "Jung believes that, the longing for personality, 'the highest realizations of the inborn distinctiveness of the particular living being,' . . . . is not exclusively a recent phenomenon. The Gnostics, the medieval alchemists, Goethe's Faust, all were concerned with the problem. The Eastern schools of Yoga aimed at the discovery of the Self. Chinese philosophy sought for Tao. Always it was a quest. And 'because neurosis is a disturbance in the development of personality' the psychotherapist of today is forced to occupy himself with the question."

"Integration. . . . is the result of an individual experience of the inner world which a man undergoes only in answer to an imperative need of his nature, a call as compelling as the 'vocation' of the religious. It is a challenge which only the courageous can face, for the primitive fear of the 'perils of the soul' will always deter the average man from looking too deeply into himself. Yet 'insofar as a man is untrue to his own law and does not rise to personality, he has failed of the meaning of his life.'"

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WHAT IS MATTER ? NEVER MIND ! WHAT IS MIND ? NO MATTER !

Note on Evolution

Dr. C. C. Hurst (author of Experiments in Genetics, The Mechanism of Creative Evolution, etc.), at the close of his HEREDITY AND THE ASCENT OF MAN (Macmillan, 1935), and after recounting the latest developments in experimental and theoretical genetics, allows himself to speculate on the future that evolution may have in store for man. He recognizes that such speculation is a hazardous process, in view of the wholly unpredictable character of germinal changes, but notes that the past ten million years -- ever since the beginning of the evolution of the human mind -- progress has been

taking us in the direction of an increasing dominance of mind over matter and an increasing independence of mind from matter. He thinks it is therefore reasonable to suppose that this movement will finally result in the complete independence of mind from matter. "Such an independence of matter might enable the more adventurous spirits among our far-away descendants to leave the earth and to visit, and maybe occupy, other planets or stellar systems of our universe or even other universes if they exist." And although physical theory predicts the final running down of our material universe, we find, superimposed upon this gloomy view, "a biological picture of the creative evolution of matter into life, mind and many higher values during this period of millions of years with the possibility of an infinite intellectual or spiritual existence beyond.... Long before the time comes for the annihilation of matter and the universe, the more primitive matter will have lost its influence on life and mind and their successors. The far distant descendants and remote successors of Man may, at that time, be independent and largely free of matter, with infinite possibilities of future progress notwithstanding the complete dissolution of the universe." (pp. 124-136).

A. H.

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#### THE SOUL OF THE WOLF CHILD

A preliminary account of the finding and re-educating of the first authentic wolf-child, Kamala, will be found in Harpers Magazine for January, by Dr. Arnold Gesell, from the diary of the finder, the Reverend J. A. L. Singh of Midnapore. Professor Robert M. Zingg of the University of Denver is preparing the diary for early publication, along with a digest of all the literature on feral man.

The authenticated cases of children captured by wolves, baboons and the like are few, and the number re-educated is very small. This is the first detailed account. The matter is of the highest importance, as bearing upon the resources of the inner individual. If human psyche, soul and spirit have any independent reality---if we admit, that is to say, the truth of Plato's position---then these inner entities have laws of being of their own and the growth of a child is the compromise between this inner entity or complex of entities and the outer body, with laws of its own in turn. When the child grows in normal habitat the results are familiar. When the child has (as this Kamala had) about seven years of wild existence then we have the interesting and pathetic case of a human psyche conditioned first to an animal situation. The question arises, Is re-education a rapid process? For if it is, it adds weight to the evidence for the pre-existence of the inner complex. In the case of Kamala the response to civilization was very rapid indeed, considering that she was at an advanced age when discovered.

F. K.

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The present brief essay is an attempt to translate into terms of broad human culture the substance of technical material recently having appeared in the articles "Nuclear Physics" in The Technology Review for December, 1940, and "Isotopes as Indicators", by Charles Rosenblum of Princeton University, in Journal of Chemical Education for the same month. The first article reports progress in that amazing field of modern science, nuclear physics - the field of phenomena within the nucleus of the atom, as evidenced at a special meeting recently held at the Massachusetts Institute of Technology. Of especial interest is the technique of tracer atoms, components of processes to be studied which are made artificially radioactive by the methods of nuclear physics, so that they can be easily detected. This method has proved invaluable in studying intricate life processes. Radioactive iodine has advanced the study of thyroid diseases, radioactive iron has yielded clues to anemia, other applications are showing how the body uses vitamins and have constituted "one of science's most effective weapons against cancer". The field is becoming so large as to point the need for a *get-together* between physicists and their colleagues in other sciences. The article does not mention the increasing difficulty which the members of such powwows are going to have in understanding one another because of the lack of a common world-view diffused in the general culture to which all these men belong.

Rosenblum's paper treats this same subject again from a chemical standpoint, and points out that it is broader than artificial radioactivity, that other isotopes than radioactive ones may be used as tracer atoms, if the isotope has some other traceable property. Thus deuterium ('heavy hydrogen') in water may be traced by the optical properties of the water. His bibliography cites 46 works on isotopic indicators and their applications.

What does all this mean ? The types of language used by the sciences and fields of learning have become so specialized that they are almost like mutually unintelligible dialects. In attempting to translate them into the cultured layman's English, the principles of cosmic order, which are the real science and wisdom of the whole thing, very easily drop out, and then the would-be interpretation merely gives the layman what amounts to a demonstration of low-grade magic. This is the trouble with the way we have presented it in the first two paragraphs; it is the ordinary way, but we are groping for a better way. You, reader, have been given first a picture of scientists experimenting, meeting, and discussing. Then the words "tracer atoms", "radioactive", "isotopes", etc. were dragged in, and you were then given another picture of some utilitarian results or things supposed to happen as a result - things about thyroid diseases, life processes, effective weapons (?) against cancer, etc. This is a picture of magic, not a picture of science at all. We feel it is not the way knowledge of the system of the universe (which is what science is) can be brought home to an educated, sophisticated modern person so that it will be an orienting and integrating factor in his life-view, as it should be. For it leaves out the very simple and yet wonderfully broadening idea - an idea within everybody's mental powers - of how all these marvels and beneficent results are arising out of the study of an orderly mathematical and intellectual harmony in the universe.

We shall now try our poor best to give some idea of how MAIN CURRENTS might suggest displaying it as an educative and culturally meaningful truth. Back in the middle of the last century Mendeleeff and Lothar Meyer discovered what had also been a poet's intuition, that "the atoms march in tune", i.e. that they form an evenly graduated sequence, like the notes of a musical scale. Emerson was a student of chemistry as well as a philosopher and poet; he believed in a synthesis of awarenesses; that all ways of getting understanding, science, poetry, religion, intuition, are glimpses of the same ultimate vista. He and a few others succeeded in getting New England really excited about this integrated wisdom - almost succeeded in making it a truly American viewpoint. We don't think we are dragging in something too remote here, for the "golden day" as Lewis Mumford calls it, of American wisdom and the Chemistry of

Mendeleeff and Meyer were not entirely without connection, but were sister episodes in the development of our culture which are due eventually for large and related fruitions.

Mendeleeff and Meyer found that the ninety-odd elements were in a numbered sequence - you could arrange the whole lot into a line in which a steady development of properties would be shown, making just one proper way to number the elements 1, 2, 3, 4, ---etc. After going along this series for a certain number of elements you come to an element which is very much like the first, followed by one which resembles No. 2, and so on as though one were tracing a spiral curve; this spiral makes seven great turns, then a minor twist containing rare elements called the rare earths, then three more great turns, coming to an abrupt end in the element uranium - though recently the possibility of "trans-uranic" elements has appeared. As this great sequence wheels upon itself, similar elements appear at seven corresponding points, making seven major chemical families, with a small scattering of elements at an eighth position. Here then is a great orderly mathematical pattern underlying the basic stuff of physical existence, showing the principle of the octave or sevenfold unfoldment. In some strange way the octave or the number seven seems to be deeply laid in the architecture of the universe; properties of vibrations run in octaves, like the octaves of sound and the one octave of visible light.

This mathematical harmony at the root of common physical stuff is the grand truth into which the isotope business fits, but for a long time it was complicated by the notion that it was due to a regular build-up in the weight of the atom of the element. Finally modern physics, in showing that atomic matter is a form of energy and not the only possible kind of real stuff, but made up of finer kinds of stuff (electrons, protons, etc.), showed that it is the atomic number, not weight, that counts in the nature of an element. An atom is some sort of marvelous whirl of energy that has a kind of mathematically expressible inner form or pulse of rhythms which determines its number in the series and its basic nature. It can lose or gain small amounts of its inner or finer matter without losing this distinctive mathematical plan; in doing so its weight will change slightly and its radiant properties may change - it may become radioactive - but it will still be sulphur or tin or gold as it was before. The possible varieties of one element having different atomic weights are called isotopes. Modern nuclear physics can now make them almost to order - in extremely small quantities. But where it is important to trace the mere presence of an element, only infinitesimal quantities are needed if they are radioactive. We can make some atoms in a lump of matter into radioactive isotopes. They will then show up the presence of matter from that lump wherever it goes, because the space around radioactive atoms is profoundly disturbed and affects sensitive electric devices.

These devices and the radiant tracer particles carried along with other matter act like extensions of our limited senses and enable us to perceive as though we had more penetrating senses. If we had such senses we should not see things in as isolated a way, stopping short at such marked boundaries as we now see. There would be zones of flowing atomic matter extending out from objects; metals and chemicals would seem almost alive for we should see motion going on within them and outflowing from them - fine matter would be wandering and streaming about, flowing away from them and right through other pieces of metal. Substances that we call catalysts we should see helping forward these interpenetrations. We can detect all this now with the isotopic tracers. A sheet of lead was pressed upon a sheet of the metal thallium (as reported in Rosenblum's paper) and it was observed that some of the drifting lead atoms percolated into the solid thallium. The amount of such wandering lead is too small to be detected by chemical tests, but it is shown up by generating some of the radioactive lead isotope within the lead sheet before putting it on the thallium; then later some of the thallium is taken to another room and the presence of radioactive lead in it causes scintillations of light on a fluorescent screen.

B. L. W.

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[The extract which follow are from an article (by R. W. Chaney in Sci. Monthly, Dec. 1940) which examines afresh a fascinating proposal to explain the present shape of continents and their geological and other features, Wegener's Hypothesis. Wegener suggested that a look at the globe shows how Spain (if Europe floated over) would fit into the Gulf of Mexico, the west African promontory would fit in under the east South American promontory, Greenland and the British Isles would pack in, Australia could be floated up into the Bay of Bengal, etc. He did extensive work to support this notion that there was once a great Polar Continent in which all the land masses were primevally one, Pangaea, he called it, the era of a whole earth. It reminds one of the Golden Age, a sort of garden of Eden, since when division and misery have come, along with diversification. A few years ago, just before his death, Wegener took a crew to Greenland to try to determine continental drift, if any, by measurement. He got a null result. Shortly afterward he died. But the theory is of the greatest interest and is heard of from time to time. We are sorry we cannot reproduce the illustrations that go with this instructive article. Ed.]

"Forest or continents--which of these have moved over the surface of the earth during the past ?" "...records of past life establish the fact of great changes during earth history. But whether these changes have involved migrations of whole continents northward is a question on which paleobotanists and geophysicists are not always in agreement." "On first thought it seems more probable that the forests have moved rather than the continents. It is necessary to turn to the fossil record for the solution of a problem which had its beginning long ages before man came to live upon the earth." "The hypothesis of continental drift, as presented by Wegener, assumes the original massing of the existing land masses into an aggregate termed Pangaea." "... Wegener definitely indicates his belief that the position of continents with relation to the north pole has also changed widely in later geologic time." "... Hutton and Lyell ... put forth the doctrine that the present is the key to the past." "The paleobotanist finds evidence that forest zoning can be traced back for tens of millions of years, to the epoch known as the Eocene." "Our conclusion that ... fossil floras indicate subtropical temperatures is based upon the assumption that plants of the past had essentially the same habitat requirements as their nearest living relatives." "The zonation of . . northern floras and of those further south is closely similar to that of corresponding modern forests. Vegetation of a given climatic type is at approximately the same distance from the north pole in Eurasia as in North America from which we conclude that these continents were grouped about the north pole in essentially their present position as far back as Eocene time."

The difference between Eocene Distribution and the present occurrence of floras "... is that in every case they ranged farther north in the past. The forests now within 36 degrees of the equator ranged beyond 51 degrees north latitude." "The subsequent migration of these forests southward to their present positions we interpret as due to climatic change. ...." Supporting this is the evidence of fossil shells. "The resulting shift of forests southward for equal distances in North America and Eurasia ... indicates that as far back as Eocene time these continents were grouped around the north pole in their present relative positions."

"The character and distribution of Eocene forests in North America definitely refutes the suggestion that the northern continents have changed their positions around the pole during later geologic time."

Last paragraph---"WE conclude that the evidence of Eocene floras, made up of close relatives of living trees whose climatic requirements are well known, strongly refutes the hypothesis of continental drift during later geologic time. The question of drift at an earlier date in earth history must be answered by reference to the nature and distribution of plant fossils in older rocks, and need not be considered here. But for tens of millions of years, since life on the earth has been similar to that of today, North America and Eurasia have occupied their present position with relation to the north pole and the ocean basins. During this latest chapter of life history, forests have migrated southward in response to changing climate, over continents whose stability through the years seems well established."





The people of ancient Mitanni (2000 B.C. to 1000 B.C., very roughly) called themselves Huruhe, whence the name Hurrian applied by modern scholars. Mitanni extended over northern Mesopotamia, Syria, and thereabouts, one of the empire-like states of that region -- Sumerians, Accadians, Amorites, Elamites, Cassites, Hurrians -- with different languages and governments but similar cultures and religions, that were formerly lumped together as "Babylonians", and a while before that as "Chaldeans". The term "Chaldean" for this whole culture-area might well be revived.

A few decades ago Mitanni and the Hurrians were unknown to historians. Yet they were once a great nation; they made statecraft deals with Egypt at the height of her glory, and their kingdom was greater and a thousand years older than that of Solomon or Hiram of Tyre. The discovery of some of their diplomatic correspondence on tablets in Egypt, followed by other tablets from the Mitannian region itself, started research that has led to some knowledge of this ancient empire on the part of a few savants. Knowledge about ancient peoples percolates to the general public with great slowness, partly from slowness of the research itself, partly for lack of popular interest in it. So while many educated people have some notion of old Babylonia or Chaldea, probably very few ever heard of the Hurrians.

Our knowledge of Mitanni depends largely on understanding the Hurrian language in written form. Through the acumen of skilled linguists much has been accomplished. But while the Sumerian and Accadian writings are now almost an open book, Hurrian is a very strange language quite unlike these, the double texts linking it to these are few, and it is still rather cryptic. The latest issue of LANGUAGE (Oct. - Dec. 1940) advances the attack on the decipherment in a paper (highly technical) by E. A. Speiser (Univ. of Penna.), and some months ago a paper by Goetze (Yale) on Hurrian also appeared in LANGUAGE. Like all these "Chaldeans" the Hurrians wrote in the cuneiform script, adapting it to their language after borrowing it from the Sumerians, its probable inventors. Hurrian was written in two ways, an alphabetic system which wrote only the consonants and a syllabic system like that of Accadian. Thus a form of the verb "to hear" was written in the first system as what would be equivalent to hsls, while in the other system the same word was symbolized in the form ha-a-su-li-e-es. The word was probably sounded something like hasules. Speiser shows how the device of doubling written consonants was used to indicate various sounds. He promises us a grammar of Hurrian in the future, and it should be important, not only in deciphering the records, but perhaps toward discovering the ancestral source of the Hurrians through language comparison.

So far, Hurrian has not been connected with any other language. It is not Semitic, not allied to Egyptian, probably not Indo-European (Aryan). It may have been kin to the Dravidian tongues of pre-Aryan India, as G. W. Brown thought in 1930, but closer study leaves this none too clear. Relation to the puzzling group of queer languages in the Caucasus looms as a possibility. Caucasian, Dravidian, Munda and other hill-tribe tongues of India, Burushaski north of Kashmir, Sumerian, and Hurrian, seem like remnants of a vanished world, one that our forefathers would have called "antediluvian" - a horizon of strange languages and cultures and probably dark-skinned, powerful, civilized peoples over the southern Orient before the spread of Semite and Aryan some 10,000 or more years ago, a world whose heyday was still earlier, stretching into "the backward and abyss" of time. Such linguistic studies as here are reported are essential to public appreciation of the significance of this elder time and the dark races it has left.

B. L. W.

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Further paintings in the familiar scarlet and ochre, manganese and clay, of the Aurignacian peoples have been found in deep caves of Labeaunie-Latrone, near Nîmes, France. These artists, hunters, probably nomads here record elephants, the hipp-

opotamus, snakes of great length, giant spiders in the masterly manner made familiar by earlier finds at Dordogne and Altamira. Since the drawings were made some 30,000 years ago massive stalagmites have formed upon the beds of the caves; but skeletons in profusion were washed from the floors into wells, prior to that. Excavations have begun under the direction of Count Henri Begouen, director of the museum, Toulouse (Herald Tribune, 9/12/40), and this find is likely to advance substantially understanding of these people which have been an enigma especially as to their origin ever since the first remains were found at Aurignac in the Haute-Garonne.

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Starvation has driven miserable people in the highlands of Peru to dig out the prehistoric graves in the district about 300 miles south of Lima, resulting in the dispersal of archaeological treasures of the highest value, and the destruction of sites which would reveal important knowledge. Stringent government rules are not enough to deter the hungry. The culture which Pizarro found and destroyed early in the sixteenth century must have been the dying remains of something unparalleled for order and internal stability. On account of the lack of written records the archaeology becomes especially important for an understanding of American antiquity. (Spokesman-Review, Spokane, 1/12/40)

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Dr. Claude M. Fuess, headmaster of Phillips Academy, Andover, Massachusetts remarked upon the decline of the New England Yankee at the dinner of the New England Society December 19th, (Herald Tribune 20/12/40) and recommended intermarriage with new stocks from Europe. In numbers and aggressiveness the immigrant often excels his neighbours. Dr. Fuess thinks "plans for stimulating the birth rate of the Daughters of the American Revolution would probably be resented and their success would be dubious."

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Edwin Frandin Dakin has edited Oswald Spengler's great work, The Decline of the West, into a single volume entitled Today and Destiny (Knopf), and a digest of this in turn will be found in the N. Y. Times 22/12/40, by Edward Larocque Tinker. Spengler was right about so much and so specifically (instance: the strain put upon the divided authority of the president and congress in time such as the present), resulting in enlargement of executive power that his pessimism has spread widely. He is a prophet to be heeded in particulars. Nevertheless Spengler may well be completely wrong in his principal thesis. A parallel instance is seen in physics. No scrap of evidence can be had from that science for the restarting of the universe after matter vanishes in the future as radiation (maximum entropy). But simple sense or instinct prompted by experience of life as against energy tells us that if a cosmos arose and will vanish it will arise again. In short, man is too short a life in time to know all the cycles. The Australian bushman is said originally not to have been able to know winter would come again. European man is only a terrestrial bushman in the solar scene. Spengler anticipated the brutal "Caesar-men" of today and a great deal more, with exactness. But the Puranas of India all the same ring more truly about evolution of the grand scale, bad as their detail so often appears to be.

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